APR 2 1968

NATIONAL BUREAU OF STANDARDS REPORT

9801

WELDABILITY OF A RAILROAD RAIL

To

Materials Development & Research Division
D. C. Department of Highways & Traffic
Washington, D. C.

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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NATIONAL BUREAU OF STANDARDS REPORT

NBS PROJECT
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WELDABILITY OF A RAILROAD RAIL

By

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To

Material Development & Research Division
D. C. Department of Highways & Traffic
Washington, D. C.

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U.S. DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

312.01/G-39216

NATIONAL BUREAU OF STANDARDS

Report

on

WELDABILITY OF A RAILROAD RAIL

Submitted by

Materials Development & Research Division
D. C. Department of Highways & Traffic
Washington, D. C.

Reference: D. C. Department of Highways and Traffic, Materials Development and Research Division, Engineer of Materials and Research request for tests dated March 12, 1968.

Test Requirements: The reference requested a test for the weldability of a railroad rail sample designated D. C. Lab. No. 3352, Contract No. 19893.

Chemical Analysis: The rail sample was found to contain the following elements:

Carbon,	0.45%
Manganese,	1.07%
Chromium,	less than 0.05%
Nickel,	less than 0.05%
Molybdenum,	less than 0.05%

The chemical composition is similar to that for A.I.S.I. C 1046.

Hardness: An average brinell hardness of 214 was found. At this hardness the approximate equivalent tensile strength is 102,000 PSI.

Discussion and Conclusions: The carbon and manganese contents of the rail sample are higher than that affording the best welding conditions. Because of the composition, cracking of the welds is a possibility.

For welding the rail it is suggested that arc welding with a low hydrogen electrode, E7015 or E7016, using a 500-700° F pre-heat and a 1100° F post heat be tried. Using the shielded metal arc welding process, Linde 65 wire may be tried with the aforementioned pre- and post heat treatments.

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